

What is claimed is:

1. A method for automatically generating a word problem, the method comprising:
receiving a designation of a problem type from a user;
identifying one or more variables based on the problem type;
assigning at least one value to at least one variable;
receiving, from a user, a designation of a variable for which to solve; and
generating an assessment item of the problem type based on the variables.
2. The method of claim 1 wherein identifying one or more variables comprises identifying a language used to generate the assessment item.
3. The method of claim 1 wherein the problem type comprises a mathematical word problem.
4. The method of claim 3 wherein assigning at least one value to at least one variable comprises determining a unit of measurement for a variable.
5. The method of claim 1 wherein assigning at least one value to at least one variable comprises assigning a range of values to a variable from which a value for the variable is selected when the assessment item is generated.

6. The method of claim 1 wherein assigning at least one value to at least one variable comprises assigning a variable used to determine a format for the assessment item.

7. A method of automatically generating an assessment item, the method comprising:

receiving one or more inputs from a user;

generating one or more variables based on the one or more inputs;

determining one or more relationships between at least two of the variables; and

generating an assessment item based on the one or more variables and the one or more relationships.

8. The method of claim 7 wherein the one or more relationships comprise relationships based on one or more of word order; word choice; word format; sentence structure; grammar; and language.

9. The method of claim 7 wherein the assessment item is a mathematical word problem.

10. A method of automatically generating an assessment item, the method comprising:

receiving one or more inputs pertaining to the format of an assessment item,

wherein the format of the assessment item comprises at least one event;

selecting one or more variables for use in the assessment item;

determining a relationship between variables assigned to each event;
determining a format for the assessment item; and
generating an assessment item based on at least the format for the assessment item
and the relationship between variables assigned to the at least one event.

11. The method of claim 10 wherein the one or more inputs comprise one or more of the following:

a number of events;
a number of distinct frames;
a type of participant in each event;
a type of assessment item to generate; and
a unit of measure for each variable.

12. The method of claim 10 wherein determining a relationship for the variables assigned to each event comprises one or more of the following:

determining a variable for which to solve for each event;
determining an answer for each event;
determining a value for one or more variables; and
determining a variable format.

13. The method of claim 10 wherein determining a format for the assessment item comprises:

determining a problem format having one or more sections; and

determining content to place within each section.

14. The method of claim 10 wherein generating an assessment item comprises one or more of the following:

selecting a language for the assessment item;

selecting a sentence structure for each sentence in the assessment item;

selecting identification types for one or more of the variables;

determining a numerical format for each of the one or more variables; and

determining a verb tense to use for each event.

15. The method of claim 14 wherein selecting identification types comprises determining to identify a variable denoting a person by using a proper name.

16. The method of claim 14 wherein selecting identification types comprises determining to identify a variable denoting a person generically.

17. The method of claim 14 wherein selecting identification types comprises determining to identify a variable denoting an object by using a label.

18. The method of claim 14 wherein selecting identification types comprises determining to identify a variable denoting an object by using a description of the object.

19. A system for automatically generating an assessment item, the system comprising:
a processor; and
a computer-readable storage medium operably connected to the processor,
wherein the computer-readable storage medium contains one or more
programming instructions for performing a method of automatically generating an assessment
item, the method comprising:

receiving a designation of a problem type from a user,
determining one or more variables based on the problem type,
assigning at least one value to at least one variable,
receiving, from a user, a designation of a variable for which to solve, and
generating an assessment item of the problem type based on the variables.

20. A system for automatically generating an assessment item, the system comprising:
a processor; and
a computer-readable storage medium operably connected to the processor,
wherein the computer-readable storage medium contains one or more
programming instructions for performing a method of automatically generating an assessment
item, the method comprising:

receiving one or more inputs from a user,
generating one or more variables based on the one or more inputs,
determining one or more relationships between at least two of the
variables, and

generating an assessment item based on the one or more variables and the one or more relationships.

21. A system for automatically generating an assessment item, the system comprising:
a processor; and
a computer-readable storage medium operably connected to the processor,
wherein the computer-readable storage medium contains one or more programming instructions for performing a method of automatically generating an assessment item, the method comprising:

receiving one or more inputs pertaining to the format of an assessment item, wherein the format of the assessment item comprises at least one event,
selecting one or more variables for use in the assessment item,
determining a relationship between variables assigned to each event,
determining a format for the assessment item, and
generating an assessment item based on at least the format for the assessment item and the relationship between variables assigned to the at least one event.

22. A method of automatically generating an assessment item, the method comprising:

receiving one or more input parameters;
generating a document structure based on the one or more input parameters;
producing a logical schema using the document structure; and
generating an assessment item based on the logical schema.

23. The method of claim 22 wherein generating a document structure comprises:
building a mental model; and
outlining the document structure based on the mental model.
24. The method of claim 23 wherein building a mental model comprises:
selecting one or more semantic frames;
generating a list of one or more events; and
binding one or more variables across the one or more events.
25. The method of claim 23 wherein outlining the document structure comprises:
generating one or more sentences for the mental model;
determining a function for each sentence; and
determining information to express in each sentence.
26. The method of claim 22, further comprising:
storing the document structure in a file.
27. The method of claim 26 wherein the file is an Extendable Markup Language (XML) file.

28. The method of claim 22 wherein the document structure includes one or more of the following:

- one or more variables;
- one or more values for at least one of the one or more variables;
- a mental model structure; and
- an outline of a sequence of one or more sentences for the assessment item.

29. The method of claim 22 wherein producing a logical schema comprises:

- outlining a sentence structure for one or more sentences; and
- determining an information format for each sentence.

30. The method of claim 29 wherein determining an information format comprises one or more of the following:

- determining a verb type for each sentence;
- determining an ordering of one or more elements for each sentence; and
- determining one or more vocabulary sets to use for each element.

31. The method of claim 22, further comprising:

- storing the logical schema in a file.

32. The method of claim 31 wherein the file is an XML file.

33. The method of claim 22 wherein generating an assessment item comprises:
- parsing the logical schema;
 - annotating the parsed logical schema with grammatical information;
 - determining words and word forms based on the grammatical information; and
 - outputting text representing the assessment item.
34. The method of claim 22 wherein an input parameter determines a language used for the assessment item.
35. A method of automatically generating an assessment item, the method comprising:
- assigning one or more mental model structure variables;
 - defining one or more identity variables for a mental model structure;
 - determining a task-relevant problem structure;
 - defining a document format; and
 - determining language variations.
36. The method of claim 35 wherein assigning one or more mental model structure variables comprises defining one or more of the following:
- one or more events;
 - one or more distinct semantic frames;
 - one or more participant types; and
 - an event type for each event.

37. The method of claim 36 wherein determining a task-relevant problem structure comprises:
- determining a variable for which to solve for each event;
 - determining an answer for each event; and
 - determining one or more values for each variable.
38. The method of claim 35 wherein determining language variations comprises:
- selecting a sentence structure for each of one or more sentences;
 - selecting a referent identification type for each of one or more participants; and
 - determining a tense for each of one or more events.
39. The method of claim 35, further comprising:
- assigning a variable determining a language in which to generate the assessment item.
40. A system for automatically generating an assessment item, the system comprising:
- a processor; and
 - a computer-readable storage medium operably connected to the processor,
- wherein the computer-readable storage medium contains one or more programming instructions for performing a method of automatically generating an assessment item, the method comprising:
- receiving one or more input parameters,

generating a document structure based on the one or more input parameters,
producing a logical schema from the document structure, and
generating an assessment item from the logical schema.

41. A system for automatically generating an assessment item, the system comprising:
a processor; and
a computer-readable storage medium operably connected to the processor,
wherein the computer-readable storage medium contains one or more
programming instructions for performing a method of automatically generating an assessment
item, the method comprising:
assigning one or more mental model structure variables,
defining one or more identity variables for a mental model structure,
determining a task-relevant problem structure,
defining a document format, and
determining language variations.